

# **Summary Report 1997**

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## **Doctorate Recipients from United States Universities**

### **Survey of Earned Doctorates**

**SPONSORED BY THE NATIONAL SCIENCE FOUNDATION, THE NATIONAL INSTITUTES OF HEALTH, THE NATIONAL ENDOWMENT FOR THE HUMANITIES, THE U.S. DEPARTMENT OF EDUCATION, AND THE U.S. DEPARTMENT OF AGRICULTURE**

## Highlights

This report presents data on recipients of research doctorates awarded by U.S. universities from July 1, 1996, through June 30, 1997. This information is taken from the 1997 Survey of Earned Doctorates, an annual census of new doctorate recipients.

- The 382 universities in the United States that conferred research doctorates awarded 42,705 doctorates during the 1996-1997 academic year, an increase of 0.7 percent over 1996. This is the highest one year total ever, 32 percent higher than the corresponding figure of a decade ago. It continues an upward trend in Ph.D.s awarded that began in 1986.
- The number of doctorates awarded by broad field in 1997 was greatest in life sciences, in which 8,213 Ph.D.s were conferred. The numbers conferred in the other broad areas for 1997 were 6,917 in social sciences; 6,574 in physical sciences; 6,497 in education; 6,052 in engineering; 5,387 in humanities; and 3,065 in business and other professional fields. Growth over the past decade has been greatest in engineering (63 percent growth since 1987).
- Women received 17,322 doctorates, or 40.6 percent of all doctorates granted in 1997. This is the highest percentage ever for women, continuing a 30-year upward trend. In 1997 women ranged between 40 and 63 percent of degree recipients in life sciences, social sciences, humanities, education, and business/other professional fields. In the physical sciences and engineering, they constituted 22.1 and 12.4 percent, respectively.
- Between 1996 and 1997 doctorates awarded to U.S. racial/ethnic minority groups increased from 8.4 to 9.0 percent of all doctorates granted, and from 12.9 to 14.3 percent of doctorates awarded to U.S. citizens. Among the 23,021 doctorates earned in 1997 by U.S. citizens who identified their race/ethnicity (97.1 percent), 1,335 doctorates were earned by blacks; 1,328 by Asians; 1,028 by Hispanics; and 149 by American Indians. Broad fields with the largest percentages of minorities were education, in which blacks were the predominant minority group, and engineering, in which Asians were the largest minority group.
- U.S. citizens received 70.8 percent of all doctorates earned in 1997 by individuals who identified their citizenship status (91.5 percent of recipients reported their citizenship). This is up slightly from the previous six years, when the U.S. percentage was about 68 percent, but probably reflects more underreporting of citizenship rather than any substantive change. China was the country of origin for the largest number of non U.S. doctorates in 1997 with 2,408; followed by India with 1,368; Taiwan with 1,209; Korea with 1,071; and Canada with 403. The percentage of doctorates earned by U.S. citizens ranged from 47.3 percent in engineering and 58.0 percent in physical sciences, to 91.0 percent in education and 82.6 percent in humanities.
- Median time to degree since the baccalaureate was 10.5 years in 1997, down slightly from 10.8 years in 1996. Median time to degree since first enrollment in any graduate program was 7.3 years, similar to the 1996 figure of 7.2 years. The typical doctorate recipient received his or her Ph.D. at age 33 years.
- More than half—53.9 percent—of doctorate recipients received the majority of their financial support for graduate education from program or institution based sources such as university fellowships or teaching and research assistantships. With regard to loans as a source of financial aid, 49.1 percent of doctorate recipients reported some level of educational indebtedness at completion of the Ph.D., 1.7 percentage points higher than the average for the preceding three years.
- Ph.D.s reporting definite postgraduation commitments (at graduation) for employment or continued study was 67.4 percent in 1997. Of those, about 72 percent will work and 28 percent will continue their studies. For U.S. citizens and those holding permanent visas, 49.1 percent of those with firm employment commitments noted academe as their planned work sector; about one fourth indicated industry or selfemployment; 7.3 percent said some level of government; the remaining 18.9 percent checked "other."

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## NOTICE

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Additional data from the Survey of Earned Doctorates and the Doctorate Records File are available free on request. (See inside back cover.) For a fee, off-the-shelf tables on the baccalaureate origins of Ph.D.s by major field of doctorate and tables on the citizenship, race/ethnicity, and sex of Ph.D.s by fine field are available to requesters. Customized tables can also be prepared at cost. For more information, please contact:

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## ACKNOWLEDGMENTS

Although the report series and the SED are not new, this is the first survey year for which the National Opinion Research Center (NORC) at the University of Chicago has been responsible for preparing the hard-copy and electronic versions of the data tables and the descriptive overview. Prior to this year, these tasks were handled, and handled well, by the National Research Council (NRC). NORC gratefully acknowledges the support, cooperation, and guidance received from its NRC colleagues during the transition year. Responsibility for actual data collection was shared between NRC and NORC. For the subsequent survey year- July 1997 through June 1998-NORC has total responsibility for distributing, collecting, and data-entering the SED questionnaire, as well as producing *Summary Report 1998*. Special appreciation is expressed to Peter Henderson, Project Manager, Eileen Milner, Prudy Brown, John Hines, Charlotte Kuh, and Marilyn Baker at NRC. The following NORC staff members worked on the transition of the project: Norman Bradburn, Senior Vice President for Research; Laura Knapp, Associate Project Director; Lance Selfa, Research Analyst; Syed Ahsan, Coordinator for the Data Preparation Center; Susan Dauber, Data Quality Analyst; Alison Baldwin, Research Assistant; Isabel Guzman-Barron, Administrative Assistant; Rebecca Hanson, Survey Statistician; Sharnia Bullock, Data Preparation Supervisor, and the Production Center Staff; Lisa Lee, Survey Methodologist; Whitney Moore, Survey Statistician; Javier Porras, Survey Statistician; and Karen Veldman, Administrative Assistant. Overall responsibility for directing the SED project at NORC was shared during the past year by Patricia Green and Thomas Hoffer, Project Directors.

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SED questionnaires are distributed by and returned to various academic officers at the nation's doctorate-granting universities (for forwarding to NORC). The project gratefully acknowledges the support and assistance of graduate deans and their staffs, registrars, dissertation secretaries, and other administrators who participate in the SED effort and contribute to its success.

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**\*\*\* IMPORTANT NOTICE \*\*\***

The estimates reported for the Survey of Earned Doctorates (SED) are simple tabulations of all available information with no adjustment for nonresponse. Therefore, differences in response rates from year to year can produce numerical fluctuations that are unrelated to real trends.

Although response to the SED has been as high as 95 to 98 percent over time, it declined to 92 percent during the 1980s. In an effort to improve the response rate, the survey methodology was modified in the years after 1989. Response rose, stabilizing around 95 percent for 1991 to 1995. However, the response rate for 1996 was 92.8 percent. The 1997 rate was 90.8 percent. (Note: These percentages represent *self-report rates*, that is, the proportion of questionnaires completed by doctorate recipients.) While survey forms containing partial information filled in by either the doctoral institution or staff of the National Opinion Research Center are not included in these rates, tables in this report incorporate the available data from these forms.) The self-report rate for 1997 may increase slightly in the next year if additional questionnaires are received from doctorate recipients. See page 121 in Appendix C for a table giving survey response rates from 1966 to 1997.

*Item* response rates have shown a parallel improvement since 1990—a natural consequence of the increase in the overall self-report rate, as well as a result of format revisions to the questionnaire and follow-ups for missing information. In 1990, new follow-up procedures were implemented to increase coverage of several variables: birth year, sex, race/ethnicity, citizenship status, country of citizenship, baccalaureate year and institution, and postgraduation plans. Response rates for these variables have since improved—especially for citizenship and race/ethnicity, resulting in an increase in the reported numbers of minority Ph.D.s. However, for 1997 the citizenship rate is lower than it has been in the most recent years.) Whether or not individuals completed the survey questionnaire, the following four data items are available for most all recipients: sex, Ph.D. institution, Ph.D. field, and Ph.D. year.

The data for a given year are updated the following year with any responses received *after* survey closure. Post-survey adjustment was most significant for 1990 and 1991 Ph.D.s, with the largest impact on the number of blacks. For both of these years the total number of black Ph.D.s increased by about 7.5 percent in the year after survey closure. The survey cycle was then extended to allow receipt of more follow-up information before closure, resulting in much smaller post-survey adjustments for 1992, 1993, 1994, and 1995 data (a 1.4 percent increase in black Ph.D.s for 1992, a 0.2 percent increase for 1993, a 0.5 percent increase for 1994, and a 1.5 percent increase for 1995).

Adjustments to data are presented in reports subsequent to the initial report for a survey. For example, updates for 1994 appeared in *Summary Report 1995*. Updates to 1997 data will be presented in next year's report.

In using SED data, the reader should keep in mind that numerical trends are affected by fluctuations in response rates. Increasing or decreasing numbers in a citizenship or racial/ethnic group reflect to some degree any change in both overall response and item response.





# SUMMARY REPORT 1997

## DOCTORATE RECIPIENTS FROM UNITED STATES UNIVERSITIES

### Introduction

*Summary Report 1997, Doctorate Recipients from United States Universities*, is the thirty-first in a series of reports on research doctorates awarded by colleges and universities in the United States<sup>1</sup>. The data presented and discussed in this report are from the annual Survey of Earned Doctorates (SED), a census of research doctoral recipients who earned their degrees between July 1, 1996, and June 30, 1997. This survey has been conducted since 1958; five Federal agencies sponsor the survey and the report. All survey responses become part of the Doctorate Records File (DRF), a virtually complete database on doctorate recipients from 1920 to 1997.

For the most part, the current report employs the same model and presents the same type of data as National Research Council (NRC) has for its recent editions. However, a few caveats and points of departure in *Summary Report 1997* are worth noting. First, the overall response rate for the 1997 survey was 90.8 percent, slightly lower than the 92.8 percent achieved in 1996. In a few item areas, missing data could affect the reliability of the conclusions; those areas are mentioned explicitly when they appear.

Second, readers will note three changes in the report this year:

1. Although the figures and tables remain approximately the same, in the accompanying text we have not provided as many “bullet points” or details denoting principal findings. Because of the myriad of possible permutations, we have chosen to err on the side of brevity and let individual readers take what is important for their selected purposes from the data. In addition, year-to-year fluctuations may be less important, and even less accurate, than a longer term perspective, especially when small differences in response rates, rather than substantive changes within and across institutions, may be producing the observed variations. As a substitute for these highlighted points, we have provided short background summaries or contexts for the data series, where appropriate.

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<sup>1</sup> The Survey of Earned Doctorates collects information on *research* doctorates only. This differs from the institutional collection of numbers of degrees done by the U.S. Department of Education on *all* doctorates. For an evaluation of the differences, see National Science Foundation, 1993, *Science and Engineering Doctorates 1960-1991*, NSF 93-301, Detailed Statistical Tables, Washington, D.C., pp. 2-6.

2. At various junctures we have provided complementary information on measures of central tendency (such as a mean or median); in some cases knowing something about the variability of these measures is not only helpful, it may be more important than the average itself. Where appropriate, complementary information on the variation will be expanded upon in future reports.
3. Just as it makes sense to distinguish among various broad fields of study and citizenship when comparing data on levels and sources of graduate financial aid, time to degree, and postdoctoral commitments and employment plans, it may be valuable to make comparisons across institution type and size as well. While there is arguably no single best way for segmenting the institutional doctoral universe, a convenient approach is to use the 1994 Carnegie Classification of Higher Education categories, which classify institutions on the basis of the overall number of doctorates awarded, the number of fields represented, and the level of annual Federal support. Different institutions may attract different types of students, who in turn may be more diverse with regard to enrollment status (full- versus part-time enrollment), age, sources of support, and subsequent employment goals and expectations. Thus, for a few selected variables, the tabular displays and discussions include distinctions by institutional category. Such delineations may also be expanded in subsequent years.

Finally, in addition to the basic tables and SED data that readers normally expect to see each year, the summary reports periodically have included special sections devoted to issues of particular importance. Within the last ten years, topics have included baccalaureate origins of doctorate recipients, differences by broad academic field, time to degree, ethnic minority and female doctorates, and postgraduation plans. For the *Summary Report 1997*, a special section is devoted to an expanded look at the dimensions of international participation in U.S. doctoral programs. This section reflects continuing interest in international students specifically, as well as the broader issues of globalization of graduate education and of the world's economies. In terms of sheer numbers and percentages, international students are a significant component of doctoral education in the United States, with almost 30 percent of all doctorates earned by non-U.S. citizens (in some individual fields that figure exceeds 50 percent).

Any assessments of aggregate numbers and averages for doctoral students must be viewed in context. For example, the level and type of financial support varies enormously by field of study—the experience of students in the physical sciences bears little resemblance to that of their peers in the humanities. Context is even more important when comparisons turn to international versus “domestic” students (domestic from the vantage point of U.S. universities and Federal and private sponsoring agencies in the United States). The fact that international

students are more concentrated in science and engineering than are U.S. students means that raw comparisons of times to degree, ratios of male-to-female students, and postdoctoral plans may be misleading. Furthermore, even within broad fields of study, distribution of financial aid varies significantly by citizenship category because of the regulations governing eligibility for certain types of support, such as national fellowship and loan programs. And, of course, the decision as to the type and location of postgraduate study or employment is not independent of the home country's restrictions with regard to visa status, the state of its own labor markets for highly skilled workers, and other public policies that affect incentives and alternatives.

## **ORGANIZATION**

*Summary Report 1997* begins with a review of aggregate trends in research doctorates awarded by U.S. universities, followed by discussions with regard to field, focusing on the seven broad fields in which doctorate recipients earned their degrees.

The discussion continues with sections examining trends in doctorate awards by sex, race/ethnicity, and citizenship, and concludes with sections describing time-to-degree statistics, sources of financial support during graduate school, and the postgraduation status and plans of doctorate recipients at the time the degree is awarded. *A special section provides a detailed profile of non-U.S. citizen doctorate recipients.*

The brief narratives of key survey findings in these sections are accompanied by figures displaying selected trend data. The numbers and percentages from which the figures are drawn are provided in a set of tables that follow the main text. Relevant tables are referenced at the bottom of the figures.

Basic tables of data on 1997 doctorate recipients are displayed in Appendix A, and trend data on the 1987-1997 Ph.D. cohorts are presented in Appendix B. Appendix C provides technical notes that include response rates and other information related to tables and figures in the body of the report. Appendix D contains a copy of the SED questionnaire used for the 1996-1997 academic year.